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[PATENT]

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

TECHNICAL CENTER 2000

Application No.: 09/994004
Filing Date: November 16, 2001
Applicant: Jeffrey L. Deeney et al.
Group Art Unit: [Unknown]
Examiner: [Unknown]
Title: METHOD AND APPARATUS FOR SUPPORTING A
CIRCUIT COMPONENT HAVING A SOLDER
COLUMN INTERCONNECTS USING AN EXTERNAL
SUPPORT
Attorney Docket: 10015590-1

Commissioner of Patents and Trademarks
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to the examination of this application, please amend it as follows:

IN THE SPECIFICATION

Please replace the following paragraphs of the specification. Applicant includes herewith an Attachment for Specification Amendments showing a marked up version of each replacement paragraph.

Please replace Paragraph [0007] with the following paragraph:

a' [0007] In an aspect of the invention, the frame includes flanges that extend over a top surface of the substrate and that are affixed to at least one of the top surface of the substrate and an outer perimeter of a lid of the integrated circuit package.

Please replace Paragraph [0008] with the following paragraph:

A' could

[0008] In an aspect of the invention, the frame is affixed to at least one of an outer [edge] perimeter of the substrate and the outer perimeter of the lid.

Please replace Paragraph [0009] with the following paragraph:

[0009] In an alternative aspect of the invention, support legs support the substrate and have a flange that is affixed to at least one of the top surface of the substrate and an outer perimeter of the lid of the integrated circuit package.

IN THE CLAIMS

Please amend the claims in accordance with the following rewritten claims in clean form. Applicant includes herewith an Attachment for Claim Amendments showing a marked up version of each amended claim.

A²

3. (Amended) The apparatus of claim 2 wherein the integrated circuit package has a lid affixed to the substrate, the lid having an outer perimeter that is smaller than an outer perimeter of the substrate, each support member having a flange extending over the upper surface of the substrate, the flange of each support member affixed to at least one of the outer perimeter of the lid and the upper surface of the substrate by adhesive.

A³

5. (Amended) The apparatus of claim 4 wherein the frame is rectangular and has a support leg and an inwardly extending flange at each corner, each support leg having first and second segments approximately at right angles to each other and each flange having first and second segments at approximately right angles to each other, each flange secured to at least one of the outer perimeter of the lid and the upper surface of the substrate by adhesive.

6. (Amended) The apparatus of claim 5 wherein the flanges are secured to both the outer perimeter of the package lid and the upper surface of the substrate by adhesive.

A⁴

8. (Amended) The apparatus of claim 2 wherein the support member comprises a frame surrounding the integrated circuit package with an inner side of the frame affixed by adhesive to at least one of an outer side of the substrate and an outer perimeter of a lid affixed to the substrate, the adhesive accommodating any variation in height of the integrated circuit package.

A⁵

10. (Amended) The apparatus of claim 9, wherein the integrated circuit package has a lid affixed to the substrate, the lid having an outer perimeter that is smaller than an outer perimeter of the substrate, each support leg having a

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flange extending over an upper surface of the substrate, each flange affixed to at least one of an outer perimeter of the lid and the upper surface of the substrate by adhesive, the adhesive accommodating any variation in height of the integrated circuit package.

a⁶

12. (Amended) The apparatus of claim 11, wherein each support leg is affixed to at least one of an outer perimeter of a lid affixed to the substrate and an outer perimeter of the substrate by adhesive, the adhesive accommodating any variation in height of the integrated circuit package.

13. (Amended) The apparatus of claim 10 wherein the integrated circuit package is a column grid array integrated circuit package.

14. (Amended) A circuit board assembly, comprising:

a. a circuit board;

b. a column grid array integrated circuit package having a substrate with an array of solder columns extending from a bottom surface of the substrate to the circuit board when the column grid array integrated circuit package is mounted on the circuit board, the column grid array integrated circuit package having a lid affixed to the substrate, the lid having an outer perimeter that is smaller than an outer perimeter of the substrate; and

c. at least one support member affixed to at least one of an outer perimeter of the lid and a top surface of the substrate by adhesive after the column grid array integrated circuit package has been mounted to the circuit board, the adhesive accommodating any variation in height of the column grid array integrated circuit package.

a⁷

15. (Amended) The apparatus of claim 14, wherein each support member has a flange extending over the upper surface of the substrate, the flange of each support member affixed to at least one of the outer perimeter of the lid and the upper surface of the substrate by adhesive.

16. (Amended) The apparatus of claim 15 wherein the column grid array integrated circuit package is rectangular and the support member comprises a rectangular frame extending around the substrate, the frame having a support leg and an inwardly extending flange at each corner, each support leg having first and second segments approximately at right angles to each other and each flange having first and second segments at approximately right angles to each other, each

flange secured to at least one of the outer perimeter of the lid and the upper surface of the substrate by adhesive.

a⁸ 19. (Amended) The method of claim 17 wherein the step of providing the support member includes providing a support member comprising a frame that extends around the substrate and affixing the frame to the substrate by adhesive, the adhesive accommodating any variation in height of the integrated circuit package.

a⁹ 21. (Amended) The method of claim 20 wherein the step of providing at least one support member comprises providing at least four support members spaced equidistantly around a perimeter of the substrate.

REMARKS

The purpose of this preliminary amendment is to clarify the application as originally filed. Favorable consideration of this application is respectfully requested.

Respectfully submitted,

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